Section I. (Amendment to the Claims)

Please amend claims 32, 33, 39, 48-53, 55, 56, 59 and 66, cancel claims 47 and 54, add claims 69-70 and withdraw claims 1-31 and 63-65, as set out below in the following listing of claims 1-70 of the application.

1. (Withdrawn) An *in-situ* generation system of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a processing chamber, said system comprising:

   (a) a fluorine source for supplying fluorine gas;

   (b) a halogen source for supplying at least one halogen species selected from the group consisting of Cl_2, Br_2, and I_2;

   (c) a processing chamber communicatively connected with the fluorine source and the halogen source; and

   (d) an energy source for supplying external energy to facilitate generation of fluorine radicals and/or fluorine-containing interhalogen compounds.

2. (Withdrawn) The *in-situ* generation system of claim 1, wherein the fluorine-containing interhalogen compounds have a general formula XF_n, and wherein X = Cl, Br, or I, and n = 1, 3, 5, or 7.

3. (Withdrawn) The *in-situ* generation system of claim 1, wherein the energy source supplies photoenergy.

4. (Withdrawn) The *in-situ* generation system of claim 3, wherein the energy source supplies ultraviolet light.

5. (Withdrawn) The *in-situ* generation system of claim 4, wherein the ultraviolet light has a wavelength in a range of from about 100 nm to about 400 nm.

6. (Withdrawn) The *in-situ* generation system of claim 4, wherein the energy source is selected from the group consisting of hydrogen lamps, deuterium lamps, xenon discharge lamps, electric arcs, discharge tubes, incandescent devices, flash tubes, and pulsed lasers.

7. (Withdrawn) The *in-situ* generation system of claim 1, wherein the energy source supplies thermal energy.

8. (Withdrawn) The *in-situ* generation system of claim 1, wherein the fluorine gas and the halogen species are separately transported into the processing chamber and mixed therein to form fluorine radicals and/or fluorine-containing interhalogen compounds.

9. (Withdrawn) The *in-situ* generation system of claim 8, wherein the processing chamber is equipped with temperature monitoring and controlling devices.

10. (Withdrawn) The *in-situ* generation system of claim 8, wherein temperature in the processing chamber is in a range of from about room temperature to about 350°C.

11. (Withdrawn) The *in-situ* generation system of claim 8, wherein temperature in the processing chamber is in a range of from about room temperature to about 100°C.

12. (Withdrawn) The *in-situ* generation system of claim 8, wherein temperature within the processing chamber is in a range of from about 280°C to about 350°C.

13. (Withdrawn) The *in-situ* generation system of claim 8, wherein the processing chamber is equipped with pressure monitoring and controlling devices.

14. (Withdrawn) The *in-situ* generation system of claim 8, wherein pressure within the processing chamber is in a range of from about 1 Torr to about 1000 Torr.

15. (Withdrawn) The *in-situ* generation system of claim 1, wherein the fluorine gas and the halogen species are mixed before entering the processing chamber.

16. (Withdrawn) The *in-situ* generation system of claim 15, further comprising a mixing chamber upstream of said processing chamber, wherein the fluorine gas and halogen species are mixed in

said mixing chamber to form fluorine radicals and/or fluorine-containing interhalogen compounds.

17. (Withdrawn) The *in-situ* generation system of claim 15, wherein the mixing chamber is equipped with temperature monitoring and controlling devices.

18. (Withdrawn) The *in-situ* generation system of claim 15, wherein temperature in the mixing chamber is in a range of from about room temperature to about 350°C.

19. (Withdrawn) The *in-situ* generation system of claim 15, wherein temperature in the mixing chamber is in a range of from about room temperature to about 100°C.

20. (Withdrawn) The *in-situ* generation system of claim 15, wherein temperature in the mixing chamber is in a range of from about 280°C to about 350°C.

21. (Withdrawn) The *in-situ* generation system of claim 15, wherein the mixing chamber is equipped with pressure monitoring and controlling devices.

22. (Withdrawn) The *in-situ* generation system of claim 15, wherein pressure in the mixing chamber is in a range of from about 1 Torr to about 1000 Torr.

23. (Withdrawn) The *in-situ* generation system of claim 15, further comprising a holding chamber positioned between said mixing chamber and said processing chamber.

24. (Withdrawn) The *in-situ* generation system of claim 23, further comprising a flow regulating device for monitoring and controlling flow rate of the generated fluorine radicals and/or fluorine-containing interhalogen compounds into the processing chamber.

25. (Withdrawn) The *in-situ* generation system of claim 24, wherein said flow regulating device comprises a mass flow controller.

26. (Withdrawn) The *in-situ* generation system of claim 1, further comprising an exhaust/abatement system downstream of said processing chamber for receiving effluent gas stream discharged by said processing chamber.

27. (Withdrawn) The *in-situ* generation system of claim 1, further comprising at least one bypassing line for flowing the fluorine gas and halogen species, either separately or in mixture, without passing through the processing chamber.

28. (Withdrawn) The *in-situ* generation system of claim 1, further comprising a diluent gas source connected with the processing chamber for supplying an relatively inert gas to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds.

29. (Withdrawn) The *in-situ* generation system of claim 28, wherein the relatively inert gas supplied by said diluent gas source comprises at least one gas species selected from the group consisting of Ar, He, and N_2.

30. (Withdrawn) An apparatus for generating chlorine trifluoride for cleaning of a processing chamber, comprising:

(a) a fluorine gas source;

(b) a chlorine gas source;

(c) a mixing chamber communicatively connected with said fluorine gas source and said chlorine gas source, for mixing fluorine and chlorine gases;

(d) a photoenergy source for supplying photoenergy to said mixing chamber to generate chlorine trifluoride therein; and

(e) said processing chamber connected with said mixing chamber.

31. (Withdrawn) An apparatus for generating chlorine trifluoride, comprising:

(a) a fluorine gas source;

(b) a chlorine gas source;

(c) a processing chamber communicatively connected with said fluorine gas source and said chlorine gas source; and

(d) a photoenergy source for supplying photoenergy to said processing chamber to facilitate generation of chlorine trifluoride therein.

32. (Currently Amended) A method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a processing chamber, comprising the steps of:

(a) providing a fluorine source for supplying fluorine gas;

(b) providing a halogen source for supplying at least one halogen species selected from the group consisting of Cl_2, Br_2, and I_2;

wherein said method is characterized by at least one of the following sequences (I), (II), (III) and (IV) of steps:

(I) (i) ~~(c)~~ flowing the fluorine gas and the halogen species from said respective sources therefor into a processing chamber communicatively connected with ~~the fluorine source and the halogen~~ said sources, without any intervening holdup of said fluorine gas and halogen species between the respective sources and the processing chamber; and

(ii) ~~(d)~~ generating the fluorine radicals and/or fluorine-containing interhalogen compounds by ~~supplying~~ introducing external energy from ~~using~~ an energy source into the processing chamber containing the fluorine gas and the halogen species;

(II) (i) providing a diluent gas source for supplying at least one inert gas;

(ii) flowing the fluorine gas and the halogen species into a processing chamber communicatively connected with the fluorine source and the halogen source;

(iii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species; and

(iv) flowing the diluent gas into the processing chamber to dilute the fluorine radicals and/or fluorine-containing interhalogen compounds contained therein;

(III) (i) flowing the fluorine gas and the halogen species into a processing chamber communicatively connected with the fluorine source and the halogen source; and

(ii) generating the fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species, wherein the fluorine-containing interhalogen compounds have a general formula XF_n, and wherein X = Cl, Br, or I, and n = 1, 3, 5, or 7, with the proviso that when X = Cl, n is 3, 5 or 7; and

(IV) (i) flowing the fluorine gas and the halogen species into a mixing chamber communicatively connected with the fluorine source and the halogen source;

(ii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the mixing chamber containing the fluorine gas and the halogen species;

(iii) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the mixing chamber into a holding chamber for storage until a pre-determined pressure threshold is reached; and

(iv) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the holding chamber into the processing chamber to effect cleaning therein.

33. (Currently Amended) The method of claim 32, comprising sequence (I), (II) or (III), wherein the fluorine-containing interhalogen compounds have a general formula XF_n, and wherein X = Cl, Br, or I, and n = 1, 3, 5, or 7.

34. (Original) The method of claim 32, wherein the energy source supplies photoenergy.

35. (Original) The method of claim 32, wherein the energy source supplies ultraviolet light.

36. (Original) The method of claim 35, wherein the ultraviolet light has a wavelength in the range from about 100 nm to about 400 nm.

37. (Original) The method of claim 32, wherein the energy source is selected from the group consisting of hydrogen lamps, deuterium lamps, xenon discharge lamps, electric arcs, discharge tubes, incandescent devices, flash tubes, and pulsed lasers.

38. (Original) The method of claim 32, wherein the energy source supplies thermal energy.

39. (Currently Amended) The method of claim 32, wherein the fluorine gas and the halogen species are separately flowed into the processing chamber and mixed therein to form the fluorine radicals and/or fluorine-containing interhalogen compounds.

40. (Original) The method of claim 32, wherein the processing chamber is equipped with temperature monitoring and controlling devices.

41. (Original) The method of claim 32, wherein temperature in the processing chamber is in a range of from about room temperature to about 350°C.

42. (Original) The method of claim 32, wherein temperature in the processing chamber is in a range of from about room temperature to about 100°C.

43. (Original) The method of claim 32, wherein temperature within the processing chamber is in a range of from about 280°C to about 350°C.

44. (Original) The method of claim 32, wherein the processing chamber is equipped with pressure monitoring and controlling devices.

45. (Original) The method of claim 44, wherein pressure in the processing chamber is in a range of from about 1 Torr to about 1000 Torr.

46. (Original) The method of claim 32, wherein the fluorine gas and the halogen species are mixed before entering the processing chamber.

47. (Canceled)

48. (Currently Amended) [[A]] The method ~~as in~~ of claim [[47]] 32, wherein the mixing chamber is equipped with temperature monitoring and controlling devices.

49. (Currently Amended) The method of claim [[47]] 32, wherein temperature in the mixing chamber is in a range of from about room temperature to about 350°C.

50. (Currently Amended) The method of claim [[47]] 32, wherein temperature in the mixing chamber is in a range of from about room temperature to about 100°C.

51. (Currently Amended) The method of claim [[47]] 32, wherein temperature within the mixing chamber is in a range of from about 280°C to about 350°C.

52. (Currently Amended) The method of claim [[47]] 32, wherein the mixing chamber is equipped with pressure monitoring and controlling devices.

53. (Currently Amended) The method of claim [[47]] 32, wherein pressure in the mixing chamber is in a range of from about 1 Torr to about 1000 Torr.

54. (Canceled)

55. (Currently Amended) The method of claim [[54]] 32, comprising sequence (IV), further comprising monitoring and controlling flow rate of the formed fluorine radicals and/or fluorine-containing interhalogen compound into the processing chamber.

56. (Currently Amended) The method of claim [[54]] 55, wherein said holding chamber is equipped with a mass flow controller.

57. (Original) The method of claim 32, further comprising the step of flowing an effluent gas stream discharged by said processing chamber into a downstream exhaust/abatement system.

58. (Original) The method of claim 32, further providing at least one bypassing line for flowing the fluorine gas and halogen species, either separately or in mixture, without passing through the processing chamber.

59. (Currently Amended) The method of claim 32, comprising sequence (I), (III) or (IV), further comprising supplying an inert gas from a diluent gas source connected with the processing chamber, to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds.

60. (Original) The method of claim 59, wherein the inert gas supplied by said diluent gas source comprises at least one gas species selected from the group consisting of Ar, He, and N_2.

61. (Original) A method of generating chlorine trifluoride, for cleaning of a processing chamber, said method comprising the steps of:

(a) providing a fluorine gas source;

(b) providing a chlorine gas source;

(c) mixing fluorine and chlorine gases in a mixing chamber communicatively connected with said fluorine gas source and said chlorine gas source;

(d) supplying photoenergy to said mixing chamber from a photoenergy source to generate chlorine trifluoride in such mixing chamber; and

(e) flowing generated chlorine trifluoride into a processing chamber connected with said mixing chamber.

62. (Original) A method for generating chlorine trifluoride, comprising the steps of:

(a) providing a fluorine gas source;

(b) providing a chlorine gas source;

(c) flowing fluorine gas and chlorine gas from said gas sources into a processing chamber; and

(d) supplying photoenergy to said processing chamber from a photoenergy source to facilitate generation of chlorine trifluoride in such processing chamber.

63. (Withdrawn) A system for generating fluorine radicals and/or fluorine-containing interhalogen compounds, comprising a fluorine source, a halogen source for supplying at least one halogen species other than fluorine, an enclosure for mixing fluorine with said halogen species other than fluorine, and a photoenergy source for supplying photoenergy to said enclosure.

64. (Withdrawn) The system of claim 63, wherein the fluorine-containing interhalogen compounds have a general formula XF_n, and wherein X = Cl, Br, or I, and n = 1, 3, 5, or 7.

65. (Withdrawn) The system of claim 63, wherein the photoenergy supplied by said photoenergy source comprises ultraviolet light.

66. (Currently Amended) A method for generating fluorine radicals and/or fluorine-containing interhalogen compounds, comprising the steps of

(i) providing a fluorine source for supplying fluorine gas; ~~and~~

(ii) providing a halogen source for ~~supplying fluorine and~~ supplying at least one halogen species other than fluorine[[,]];

(iii) providing a diluent source for supplying a relatively inert gas;

(iv) mixing fluorine with said halogen species in an enclosure~~, and~~ ;

(v) supplying photoenergy to said enclosure from a photoenergy source to facilitate generation of the fluorine radicals and/or fluorine-containing interhalogen compounds; and

(vi) supplying the inert gas to the enclosure to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds.

67. (Original) The method of claim 66, wherein the fluorine-containing interhalogen compounds have a general formula XF_n, and wherein X = Cl, Br, or I, and n = 1, 3, 5, or 7.

68. (Original) The method of claim 66, wherein the photoenergy supplied by said photoenergy source comprises ultraviolet light.

69. (New) A method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a processing chamber, comprising the steps of:

(a) providing a fluorine source for supplying fluorine gas;

(b) providing a halogen source for supplying at least one halogen species selected from the group consisting of Cl_2, Br_2, and I_2;

(c) flowing the fluorine gas and the halogen species into a mixing chamber communicatively connected with the fluorine source and the halogen source;

wherein said method is characterized by at least one of the following sequences (I) and (II) of steps:

(I) (i) providing a diluent gas source for supplying at least one inert gas;

(ii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the mixing chamber containing the fluorine gas and the halogen species;

(iii) flowing the fluorine radicals and/or fluorine-containing interhalogen compounds into the processing chamber communicatively connected with the mixing chamber; and

(iv) flowing the diluent gas into the processing chamber to dilute the fluorine radicals and/or fluorine-containing interhalogen compounds contained therein; and

(II) (i) generating the fluorine-containing interhalogen compounds by introducing external energy from an energy source into the mixing chamber containing the fluorine gas and the halogen species, wherein the fluorine-containing interhalogen compounds have a general formula XF_n, and wherein X = Cl, Br, or I, and n = 1, 3, 5, or 7, with the proviso that when X = Cl, n is 3, 5 or 7; and

(ii) flowing the fluorine radicals and/or fluorine-containing interhalogen compounds into the processing chamber communicatively connected with the mixing chamber.

70. (New) The method of claim 69, further comprising the step of flowing the formed fluorine radicals and/or fluorine-containing interhalogen compounds into a holding chamber positioned between said mixing chamber and said processing chamber before entering into the processing chamber.

Section II. (Amendments to the Drawings)

Please replace the originally filed informal drawings of the application (FIGS. 1-2; two sheets of drawings) with the enclosed replacement sheets for FIGS. 1-2 (two sheets) contained in **Appendix A (Replacement Sheets of Drawings)** hereof.

The enclosed replacement sheets of drawings obviate the Draftsperson's objection to originally filed FIGS. 1-2, relating to the arrangement of views and the quality of lines, numbers and letters.

The replacement drawings are of proper form, and their entry is respectfully requested.